



OLAA WATER FLUME.

bulk of California oil is good for fuel, but is not a good refining oil, and the present methods of burning crude oil as fuel were then unknown.

The State Mining Bureau of California has recently issued a bulletin on oil and gas yielding formations of California of nearly 250 pages. The bulletin states that there is an oil bearing formation extending in a belt along the Pacific Coast, from Mexico to Alaska.

The oil-bearing strata consists of shale, sandstone and fossiliferous conglomerate. Oil is never found in granite formation. The greatest quantity of oil in this belt has been found in California south of San Francisco, the belt being about 70 miles in width, by 600 in length, equal to an area of 42,000 square miles, or 27,000,000 acres.

The oil strata are found at all depths from a few feet to 3,000 feet, and are reached by bored wells of the artesian type.

The bulk of the recent great oil finds have been at a depth of from 800 to 1,000 feet.

The following table of production shows the rapid and enormous increase of the output of California crude oil. It is not exact, but is amply so to demonstrate the character of the supply:

CRUDE OIL OUTPUT OF CALIFORNIA.

Previous to 1876	175,000 barrels
1876	12,000 barrels
1880	40,000 barrels
1885	325,000 barrels
1890	307,000 barrels
1895	1,208,000 barrels
1899	2,292,000 barrels

The figures for 1900 and 1901 are not at hand, but the industry is increasing by leaps and bounds, and is now probably twice what it was in 1899.

The production of oil in California was progressing steadily, but not with phenomenal rapidity, until about five years ago, when large finds were made in the vicinity of Los Angeles. Within the last two years or so, oil has been found in Bakersfield at the head of the San Joaquin river, several hun-

dred miles from San Francisco, in quantities greater than ever before known in the history of the world, it



OLAA CANE.—16 Months Ratoons.

Being only rivalled by the great strikes in Texas made during the present year. At Bakersfield, over an area of several square miles, wells down to a depth of

approximately 1,000 feet, have developed over 500 feet in depth of oil bearing sand.

In most formations the oil is found in porous sandstone or shale rock. At Bakersfield the oil is simply standing in solution in loose sand, as free as beach sand. What may be found below is yet unknown, but in the actually tested territory there are now hundreds of millions of barrels of oil, not "in sight," but available simply for the pumping.

Other fields, notably at McKittrick, Coalinga and on the coast slope near Ventura, have developed oil fields only less extensive than Bakersfield. New finds are being made at frequent intervals, although the low price of oil has to a great extent stopped new prospecting and development.

Nearly every power-using concern in California is today using fuel oil, including the transcontinental railroads, the sugar refineries, the street railways, foundries, machine shops and flour mills, whether the consumption is hundreds or hundreds of thousands of barrels. The permanency of the California supply of crude oil for certainly a generation to come is certain and beyond question.

2. FUEL VALUE OF CRUDE OIL.

The claims made for oil vary widely,

omitted, as it is not intended to herein differentiate between coals. It is sufficient to say that the highest is Welsh anthracite, the recognized highest quality of coal, and that the others are commercial coals in common use here and in California.)

COMPARATIVE EVAPORATIVE POWER OF COAL AND OIL.

Another test is a comparison of the number of pounds of water that a pound of coal and of oil will respectively evaporate, with the water at an initial temperature of 212 degrees.

The following tests of different Los Angeles oils, of an approximate gravity of 15°, were also furnished me by Mr. W. S. Miller:

EVAPORATIVE POWER OF OIL.

Oil A, 1 lb evaporated	14.50 lbs water.
Oil B, 1 lb evaporated	15.09 lbs water.
Oil C, 1 lb evaporated	15.10 lbs water.
Oil D, 1 lb evaporated	15.10 lbs water.

EVAPORATIVE POWER OF COAL.

A series of tests of seven different coals in common use in the islands, viz.: WallSEND, Duckenfield, Waratah, Wenington, Comax, East Greta and Roslyn, was made at a local plantation last July, in a new 250-horse power Helne boiler, for the purpose of ascertaining their relative evaporative power. The following was the result:

ranging all the way from 3½ to 5 barrels as the equivalent of a ton of coal. The differences are largely accounted for in three ways, viz: The difference in quality of coal used in the respective tests; second, the difference in quality and condition of the furnaces in which the tests are made; and third, the difference in the kind of apparatus used and the intelligence with which the plant is handled. Reduce these three elements of divergence to a common basis, and the difference in results is but slight.

DIFFERENT QUALITIES OF COAL.

"A ton of coal" is a very loose term as an indication of fuel value. An illustration of this is shown in the following tests furnished me by Mr. W. S. Miller of the Standard Oil Company. They were made by their own experts for their own information.

COMPARATIVE TESTS OF COAL AND OIL.

In each case one ton of coal evaporated the same amount of water as did the number of gallons of crude oil set opposite.

Name of Coal	Equivalent in gallons of oil	Equivalent in bbls. of oil
Welsh anthracite	193.60	4.59
Coal A	168.79	4.01
Coal B	164.70	3.90
Coal C	152.30	3.62
Coal D	147.40	3.50

(The names of the different coals are

(Identification of coals is omitted.)

1 lb Coal A evaporated	6.804 lbs water.
1 lb Coal B evaporated	6.834 lbs water.
1 lb Coal C evaporated	7.017 lbs water.
1 lb Coal D evaporated	7.069 lbs water.
1 lb Coal E evaporated	7.267 lbs water.
1 lb Coal F evaporated	7.354 lbs water.
1 lb Coal G evaporated	7.549 lbs water.

DEDUCTIONS FROM ABOVE STATISTICS.

Fourteen degree oil weighs 8 lbs to the gallon or 336 lbs to the barrel of 42 gallons, and 18 degree oil weighs 7.88 lbs to the gallon or 330 lbs to the barrel, an average of 333 lbs to the barrel.

Assuming from the above statistics that one lb of coal will evaporate say 7½ lbs of water, 1 ton of coal of 2240 lbs will evaporate 16,800 lbs of water.

Likewise assuming that one lb of oil will evaporate 14½ lbs of water, 333 lbs of oil or one barrel will evaporate 4828.5 lbs. of water.

That is to say, one ton of average coal has the same amount of available heating power as 3.47 bbls of oil.

STATEMENT OF A. M. HUNT.

In reply to a direct question put to Mr. Hunt, as to the relative evaporative power of coal and oil, he replied that in a clean boiler in good condition a pound of the average coal used commercially in San Francisco should regularly evaporate from 7 to 8 lbs of water and a pound of crude oil should evaporate 14 to 15 lbs of water; that if it did less there was defect in apparatus



H. L. KERR, Architect.